



U. S. Steel Corporation  
Minnesota Ore Operations  
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June 30, 2015

Mr. John Thomas  
Pollution Control Specialist Senior  
Compliance and Enforcement Section, Industrial Division  
Minnesota Pollution Control Agency (MPCA)  
525 Lake Avenue South, Suite 400  
Duluth, MN 55802

**Re: Revised Groundwater Sulfate Reduction Plan (GWSRP) implementation update**

Dear Mr. Thomas:

Pursuant to the February 25, 2014 approval letter of the revised GWSRP for the Minntac Tailings Basin, U. S. Steel is submitting this letter to the MPCA as the third required six month implementation update. As indicated in an April 25, 2014 letter to you regarding Selection of Alternatives for Further Investigation related to the GWSRP, U. S. Steel has chosen to evaluate implementation of a Permeable Reactive Barrier (PRB) that utilizes zero valent iron and/or addition of organic substrates, in combination with the existing seep collection and return system, as a means to achieve compliance with groundwater standards at its property boundary near MW12 (focus area).

U. S. Steel is working with Ramboll-Environ, Northeast Technical Services and others to investigate and evaluate PRB technologies for use in this application. As detailed in an April 25, 2015 submittal regarding hydraulic modeling/microcosm study, a microcosm study was initiated early in 2015. Based on the original microcosm study results, several other microcosm studies have been performed since then to quantify the interaction of various parameters (e.g., temperature, carbon substrates/additions, and reducing agents).

Field work continued at the focus area for the first half of 2015. Two transects across the focus area were analyzed using two separate geophysical techniques (ground penetrating radar (GPR) and resistivity) to determine the depth of bedrock and other subsurface characteristics of the site. Pumping wells and nested piezometers were drilled to varying depths at eleven locations in the focus area to better assess the properties of the subsurface glacial deposits and verify the bedrock channel as compared to the geophysical results. These wells were also used for ground water analyticals, pump tests and hydraulic conductivity testing.

Continued investigation of a PRB as an alternative to achieve compliance with the groundwater standard will require additional small scale testing to evaluate feasibility, performance and design factors. This small scale testing will continue to utilize the microcosm studies previously laid out as well as column studies to better simulate real world conditions.

U. S. Steel will utilize all the results and information collected from both the site and lab work to develop a design for a pilot study. As indicated in the approved amended GWSRP, this pilot study design will be completed no later than August 25, 2015 (four months from the hydraulic modeling / microcosm study – April 25, 2015).

U. S. Steel submitted an addendum to the amended GWSRP on March 26, 2015 to address elevated levels of sulfate in groundwater at MW13. MPCA responded with an e-mail on April 3, 2015 indicating that the plan was not approved and further discussions of their concerns would be conducted at a future meeting with the agency. U. S. Steel looks forward to the proposed meeting to discuss the addendum which would address groundwater quality at the property boundary near MW13.

If you have any questions or concerns regarding this matter, please contact me.

Sincerely,

A handwritten signature in cursive script, appearing to read "Chrissy Bartovich".

Chrissy Bartovich  
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